

**WHAT IS CLAIMED IS:**

1. A piezoelectric speaker comprising:
  - a body including a bottom portion and a circular sidewall, the bottom portion having a throttle hole in a center thereof, wherein a upper surface from the throttle hole to side wall has a curve contour;
  - a reflection cover located over and spaced from the body, the reflection cover having a tip at a lower center and a lower plane having waving contours from the tip to a periphery of the reflection cover;
  - a means for fixing the body and the reflection cover;
  - a lower cover having a plate-shaped bottom portion and a sidewall formed on a periphery thereof, the lower cover being connected to the body; and
  - a piezoelectric transducer element inserted between the body and the lower cover, the piezoelectric transducer element including a metal disc having a passing hole and a piezoelectric element attached to the metal disc, each of the metal disc and the piezoelectric element connected to wires.
2. The piezoelectric speaker according to claim 1, wherein the upper contour of the bottom portion has a concave portion from a periphery top end of the throttle hole to the inner sidewall and the waving contours of the lower plane of the reflection cover are corresponding to the upper contours of the bottom portion.
3. The piezoelectric speaker according to claim 1, wherein the body and the lower cover are connected by a ultrasonic fusion or a molding using epoxy resins.
4. The piezoelectric speaker according to claim 1, wherein the metal disc is circular.
5. The piezoelectric speaker according to claim 1, wherein the metal disc made of

materials selected from the group consisting of brass, stainless steel, or nickel alloy.

6. The piezoelectric speaker according to claim 1, wherein the passing hole are formed at the central portion between a periphery of the metal disc and a periphery of the piezoelectric element.

7. The piezoelectric speaker according to claim 1, wherein the passing hole has a diameter of about 4 to about 6.5 mm.

8. The piezoelectric speaker according to claim 1, wherein the piezoelectric element is circular.

9. The piezoelectric speaker according to claim 1, wherein the piezoelectric element has a diameter about 24 to about 26 mm.

10. The piezoelectric speaker according to claim 1, wherein the piezoelectric element has a thickness of about 0.15 to about 0.25 mm

11. The piezoelectric speaker according to claim 1, wherein the piezoelectric element is made of ceramics.

12. The piezoelectric speaker according to claim 1, wherein each of the metal disc and the piezoelectric element has a bonding portion to connect the metal disc and the piezoelectric element to the wires, and each of the bonding portion is formed on the same line around a center of the piezoelectric transducer element.

13. The piezoelectric speaker according to claim 1, wherein each of the metal disc and the piezoelectric element has a bonding portion to connect the metal disc and the piezoelectric element to the wires, and each of the bonding portion is positioned at 170 to 190 degrees away around a center of the piezoelectric transducer element from a center of the passing hole.

14. The piezoelectric speaker according to claim 12, wherein each of the bonding

portion is positioned at 170 to 190 degrees around away around a center of the piezoelectric transducer element from a center of the passing hole.

15. The piezoelectric speaker according to claim 1, wherein each of the metal disc and the piezoelectric element has a bonding portion to connect the metal disc and the piezoelectric element to the wires and a surface of each of the bonding portion is coated.

16. The piezoelectric speaker according to claim 15, wherein the surface of each of the bonding portion are UV-coated.

17. The piezoelectric speaker according to claim 12, wherein a surface of each of the bonding portion is coated.

18. The piezoelectric speaker according to claim 1, further comprising a case surrounding a lower part of the body and whole of the lower cover.

19. A piezoelectric speaker comprising:

a body including generally circular side wall portion having a sloped inner side wall;

a bottom portion defining with the body a first chamber therebelow having a circular rim and a second chamber thereabove with the circular side wall, the bottom portion defining a throttle hole therethrough interconnecting the first and second chambers, a upper contour from the throttle hole to the side wall having only one concave;

a piezoelectric transducer element having a metal disc and a piezoelectric element longitudinally bonded underneath to the metal disc inserted in the first chamber;

a cover means fixed to the body in the first chamber and having a circular side wall thereof retaining the metal disc of the piezoelectric transducer element in positions by means of a peripheral top edge of the circular side wall coacting with the circular rim of the bottom portion and using a resin molding method or a ultrasonic fusion method; and

a reflection cover extending over the second chamber and, spaced from the bottom portion, the reflection cover having a contoured inner surface with a curved cross-sectional configuration with a protruding tip located adjacent to the throttle hole of the bottom portion and defining a plurality of discharging openings.

#### **ABSTRACT OF THE DISCLOSURE**

A piezoelectric speaker has a body, a reflection cover and a lower cover so as to increase durability and generate effective sound waves. A piezoelectric speaker comprises a body having a bottom portion defining a throttle hole in the center and a circular sidewall in the periphery, a reflection cover over and spaced to the body, a lower cover connected to the lower plane of the body and a piezoelectric transducer element including a metal disc forming a passing hole through a part of it and a piezoelectric element attached to the metal disc.